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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,368	12/09/2003	Kenneth Boyd	81092489FGT1890	1367

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EXAMINER	
THORNEWELL, KIMBERLY A	

ART UNIT	PAPER NUMBER
2128	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/707,368	BOYD ET AL.	
	Examiner	Art Unit	
	Kimberly Thornewell	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-9 were originally presented for examination. In the Office Action dated 8/22/2006, all of claims 1-9 were rejected. In the reply dated 11/22/2006, the Applicant amended claims 1-9 and therefore all of claims 1-9 are pending in the instant application.

Response to Arguments

Double Patenting

2. The terminal disclaimer filed on 11/22/2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of the full statutory term of any patent granted on Application 10/707,365, has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Objections

3. The claim objections set forth in paragraph 4 of the previous Office Action are withdrawn because, as pointed out by the Applicant, they are directed to co-pending application 10/707,365.

4. The Examiner thanks the Applicant for amending claims 2, 5, and 8 in order to overcome the claim objections. Accordingly, the objection to these claims for informalities is withdrawn.

35 USC 112 Rejections

5. The Examiner thanks the Applicant for amending claims 1 and 7 to correct the ambiguity of the "first" and "previously determined" steering wheel angles. Accordingly, the rejection of claims 1, 2 and 7-9 under 35 USC 112, first paragraph is withdrawn.

6. Regarding the rejection of claims 3, 6 and 9 under 35 USC 112, second paragraph, in light of the Applicant's clarification of the term "maximum scale factor" and the example set forth in paragraph [0035] of the specification, the rejection of the term is withdrawn.

35 USC 101 Rejections

7. As pointed out by the Applicant, the rejection of the claims under 35 USC 101 applies to the co-pending application. Accordingly, the rejection of the claims is withdrawn.

35 USC 102/103 Rejections

8. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharp et al., "Optimal Preview Car Steering Control," published in Vehicle System Dynamics, Volume 35, no. ICTAM, in 2001, in view of Peng et al., "Optimal Preview Control for Vehicle Lateral Guidance" California Partners for Advanced Transit and Highways 1991.

As per claim 1,

Sharp discloses a simulation system for simulating an operation of an automotive vehicle comprising:

- An input providing vehicle information **(page 2 section 2)** and path information **(page 4 section 3)**, an initial steering wheel input **(page 6 first full paragraph,** *when k=1*) and an initial look ahead point **(page 4 section 3 second paragraph,** *y.sub.rh*);
- A controller having a vehicle computer model therein **(page 1 last paragraph lines 8-11)**, said controller programmed to:
    - Determine a curvature of an intended path from the path information **(page 5 figure 3,** *taught as computing the road angle*),
    - Determine a look ahead scale factor as a function of the intended path **(page 10,** *second full paragraph, taught as setting a preview time based on the curvature of the path*),
    - Determine a revised look ahead point as a function of the look ahead scale factor **(page 10,** *second full paragraph, taught as using the preview time in order to determine the preview point ahead of the car*),
    - Determine a steering wheel angle input to the computer model by comparing the revised look ahead point and the intended path **(page 10,** *second full paragraph, taught as "using the perceived path error to steer the 'correct' way"*),

- Operate the computer model with the steering wheel angle input **(page 5 last paragraph-page 6 first paragraph,** *taught as using the system with the steering wheel angle input*), and
- Generate an output in response to the vehicle model and the initial steering wheel input **(page 5 figure 4,** *taught as the error being based on the steering wheel angle input*).

Sharp does not disclose expressly the path information comprising a road radius of curvature, or the look ahead scale factor being a function of the intended path radius of curvature. Peng discloses a method controlling a vehicle using an optimal preview control algorithm. Peng teaches the input having path information containing a radius of curvature (**page 6 last paragraph**). Peng further teaches determining a look ahead scale factor as a function of the intended path radius of curvature (**page 9 equation 17**, *taught as a function of w, which is disclosed in page 6 last paragraph as the inverse of the radius of curvature*).

It would have been obvious to one of ordinary skill in the art of steering control, at the time of the present invention, to modify Sharp's method of determining a look ahead scale factor with Peng's use of the radius of curvature. The motivation for doing so would have been to reduce error in calculating preview data by taking into consideration changes in road curvature (Peng page 5 first two paragraphs).

As per claim 2,

Peng teaches the look ahead scale factor being directly proportional to the radius of curvature of the intended path **(page 9 equation 17)**.

As per claim 3,

Sharp teaches during straight-line vehicle travel, the look ahead scale factor being about 62 percent of a predetermined maximum scale factor (**page 10 second full paragraph,** ***taught as the scale factor being 1.5 at high speeds or 1, which is 2/3 of the maximum of 1.5, at low speeds***). Setting the scale factor to 62 percent of a maximum is considered an obvious design choice, as it is unclear exactly how close to 62 percent the scale factor would have to be to meet the claim.

As per claim 4,

Sharp teaches a method of operating a vehicle computer model having vehicle information **(page 2 section 2)** and path information **(page 4 section 3)** therein comprising:

- Determining a curvature of an intended path from the path information **(page 5 figure 3,** *taught as computing the road angle*),
- Determining a look ahead scale factor as a function of the intended path curvature **(page 10,** *second full paragraph, taught as setting a preview time based on the curvature of the path*),
- Determining a look ahead point as a function of the look ahead scale factor **(page 10,** *second full paragraph, taught as using the preview time in order to determine the preview point ahead of the car*),

- Determining a steering wheel angle input to the computer model by comparing the look ahead point and the intended path **(page 10,** *second full paragraph, taught as "using the perceived path error to steer the 'correct' way"***),**
- Operating the computer model with the steering wheel angle input **(page 5 last paragraph-page 6 first paragraph,** *taught as using the system with the steering wheel angle input***).**

Sharp does not disclose expressly the path information comprising a road radius of curvature, or the look ahead scale factor being a function of the intended path radius of curvature. Peng discloses a method controlling a vehicle using an optimal preview control algorithm. Peng teaches the input having path information containing a radius of curvature **(page 6 last paragraph)**.

It would have been obvious to one of ordinary skill in the art of steering control, at the time of the present invention, to modify Sharp's method of operating a vehicle computer model with Peng's use of the radius of curvature. The motivation for doing so would have been to reduce error in calculating preview data by taking into consideration changes in road curvature (Peng page 5 first two paragraphs).

As per claim 5,

Sharp teaches the look ahead scale factor being directly proportional to the curvature of the intended path **(page 10 last paragraph, taught as high oscillation requiring higher preview times)**.

As per claim 6,

Sharp teaches during straight-line vehicle travel, the look ahead scale factor being about 62 percent of a predetermined maximum scale factor (**page 10 second full paragraph,** ***taught as the scale factor being 1.5 at high speeds or 1, which is 2/3 of the maximum of 1.5, at low speeds***). Setting the scale factor to 62 percent of a maximum is considered an obvious design choice, as it is unclear exactly how close to 62 percent the scale factor would have to be to meet the claim.

As per claim 7,

Sharp teaches a method of operating a vehicle computer model having vehicle information **(page 2 section 2)** and path information **(page 4 section 3)** therein comprising:

- Providing an initial steering wheel angle (**page 6 first full paragraph**, *when k=1*);
- Determining a curvature of an intended path from the path information **(page 5 figure 3,** *taught as computing the road angle*);
- Determining a look ahead scale factor as a function of the intended path curvature **(page 10,** *second full paragraph, taught as setting a preview time based on the curvature of the path*);
- Determining a look ahead point as a function of the look ahead scale factor **(page 10, second full paragraph,** *taught as using the preview time in order to determine the preview point ahead of the car*);

- When the vehicle is not on target, determining a revised steering wheel angle input to the computer model by comparing the look ahead point and the intended path **(page 10, second full paragraph,** *taught as "using the perceived path error to steer the 'correct' way"*);
- Operating the computer model with the revised steering wheel angle input **(page 5 last paragraph-page 6 first paragraph,** *taught as using the system with the steering wheel angle input*); and
- When the vehicle is not on target, maintaining the initial steering wheel angle **(page 6 last paragraph – page 7 first paragraph,** *taught as when q1 and q2 are low, which keeps the vehicle on target, the steer angle is maintained*).

Sharp does not disclose expressly the path information comprising a road radius of curvature, or the look ahead scale factor being a function of the intended path radius of curvature. Peng discloses a method controlling a vehicle using an optimal preview control algorithm. Peng teaches the input having path information containing a radius of curvature **(page 6 last paragraph)**.

It would have been obvious to one of ordinary skill in the art of steering control, at the time of the present invention, to modify Sharp's method of operating a vehicle computer model with Peng's use of the radius of curvature. The motivation for doing so would have been to reduce error in calculating preview data by taking into consideration changes in road curvature (Peng page 5 first two paragraphs).

As per claim 8,

Sharp teaches the look ahead scale factor being directly proportional to the curvature of the intended path **(page 10 last paragraph, taught as high oscillation requiring higher preview times)**.

As per claim 9,

Sharp teaches during straight-line vehicle travel, the look ahead scale factor being about 62 percent of a predetermined maximum scale factor (**page 10 second full paragraph, *taught as the scale factor being 1.5 at high speeds or 1, which is 2/3 of the maximum of 1.5, at low speeds***). Setting the scale factor to 62 percent of a maximum is considered an obvious design choice, as it is unclear exactly how close to 62 percent the scale factor would have to be to meet the claim.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Thornewell whose telephone number is (571)272-6543. The examiner can normally be reached on 9am-5:30pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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KAT

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SUPERVISORY PATENT EXAMINER